Cholestasis in a Body-Builder after use of Metandienone - a Case Report

Ulrich Hoffmann[1], Petra Przybilla[2], and Günter Kraatz[3]

[1] Institute of Pharmacology, Friedrich-Loeffler-Str. 23 d, [2] Clinic for Medicine A, Department of Emergency Medicine, F.-Loeffler-Str. 23a, [3] Clinic for Medicine A, Department of Nephrology, F.-Loeffler-Str. 23 a, Ernst-Moritz-Arndt Unversity Greifswald, D-17487 Greifswald, Germany.

Abstract

The use of anabolic steroids is widespread particulary among bodybuilders. Students and teenagers apply the substances without practise in sport. Most athletes have only a crude pharmacological knowledge regarding these drugs and warnings of steroid misuse are neglected. We report on a 24-year old man who was supplementing his training programm with the uptake of high doses of Dianabol®, 50 mg daily since 8 weeks. He was admitted to the hospital because of left-side flank pain. The blood chemistries showed elevated aspartate and alanine aminotransferases, elevated creatine kinase and creatine and normal γ-glutamyltransferase levels. Metandienone could be detected by gaschromatography/masspectrometry. Clinical findings and biochemical parameters were compatible with cholestasis induced by anabolic steroids. The illicit use of megadoses of androgenic anabolic steroids to obtain an athletic, healthy looking body can lead to serious and often irreversible organ damages. In the case of hepatoxicity and severe cholestasis the prompt withdrawal of the steroid and the administration of ursodeoxycholic acid is recommend.

Introduction

The number of women and men, including teenagers and young adults, in popular sports self-administering ergogenic agents is an increasing problem. Most athletes use anabolic-androgenic steroids (AAS) to obtain a well trained, athletic, and healthy looking body, yet in combination with resistance work-out myofibril damage and rhabdomyolysis were observed. Nowadays anabolic compounds are the third most commonly used drugs behind cannabis and amphetamines. Although metandienone (Dianabol®) has been banned since 1987 in most West European countries and the USA, the illicit drug comes to the European market from Eastern Europe or South East Asia. The anabolic black market is a lucrative commercial business.

We would like to report about a patient with acute cholestasis associated with muscle damage and degenerative changes of the lumbar spine, who used metandienone as an anabolic steroid.

Case report

A healthy 24-year-old man was admitted to the Emergency Department with symptoms of a sudden left-side flank pain. He was a body builder. Physical examination revealed pain on touch and movement and his left side showed a swelling. Both kidneys were slightly increased in length up to 12 cm as was detected by ultrasonography. The medical history did not show any evidence of liver disease or adverse drug reactions. Clinical details and biochemical findings are represented in the Table 1. The taking of anabolic steroids was proven as metandienone could be detected in urine by gaschromatography/masspectrometry. The anamnestic information revealed a daily intake of 8-12 tablets of 5 mg metandienone since 8 weeks.

[1] jaki@uni-greifswald
[2] przybill@uni-greifswald.de
[3] kraatz@uni-greifswald.de

Tab. 1 : Clinical and biochemical profile of a body builder using metandienone

Parameter	Result	Reference range
blood pressure	160/80 mm Hg	120/80 mm Hg
heart rate	80 bpm	60 bpm
total bilirubin	22.6 µmol/l	< 17 µmol/l
direct bilirubin	6.1 µmol/l	< 5 µmol/l
ALAT	2.6 µmol/sl	0.22 - 0.67 µmol/sl
ASAT	4.1 µmol/sl	< 0.62 µmol/sl
AP	2.0µmol/sl	1.5 – 4.3 µmol/sl
GGT	0.38 µmol/sl	< 0.82 µmol/sl
LDH	48.8 µmol/sl	3.8 – 7.7 µmol/sl
CK	24.2 µmol/sl	< 3.25 µmol/sl
Creatinine	138 µmol/l	50-100 µMol/l
Myoglobin	560 µg/l	< 90 µg/l
CRP	61.7mg/l	< 5 mg/l
Leukocytes	15.7 GPT/l	< 10 GPT/l

Abbreviations: ALAT - alanine aminotransferase, ASAT - aspartate aminotransferase, AP- alkaline phosphatase, GGT - γ-glutamyltransferase, CK - creatine kinase, CRP - C-reactive protein, LDH - lactate dehydrogenase, GPT - giga particles per litre.

Discussion

During the last years there has been a dramatic increase in the non-therapeutic use of anabolic steroids in semi-professional competitive and in popular sports. Especially C-17 alkylated anabolic steroids such as metandienone cause severe hepatic dysfunction. The mechanisms by which these drugs cause deleterious effects remain unclear. Specific targets for cholestasis-inducing steroids are bile acid transporters. Drugs can interfere with bile acid uptake and intrahepatic transport, causing disturbances of the canalicular secretion. We conclude that the high dose application of more than 50 mg per day was responsible for the mixed cholangiolitic and hepatic changes seen by the elevated levels of serum ALAT and ASAT. The levels of GGT and AP were normal. The doses of anabolic androgenic steroid taken was, in pharmacological sense, very high, i.e. ten times the prescribed for androgen substitution. Additionally a muscle damage should be considered if the elevated CK and creatinine levels are found. The increase of C reactive protein confirms an inflammable reaction of the liver. Taking anabolic steroids and intense resistance training regimes cause myofibril damage and an increased production of free radicals, that is followed by the increase of the membrane permeability, resulting in enzyme leakage. Steroid users show a markedly increased level of ALAT, ASAT, CK, and creatinine compared with steroid non-users [1]. Exertional rhabdomyolysis accompanied by myoglobinurie, and an elevated serum creatine kinase level is reported for one body builder who was taking anabolic steroids [2]. Likewise renal impairment is a possilble complication of cholestasis. Renal failure was reported in a patient due to consumption of high doses of AAS and ß$_2$-adrenoceptor agonists clenbuterol [3]. In spite of increased levels of myoglobin, lactate dehydrogenase, and creatine kinase we did not observe any signs for rhabdomyolysis. Further reported negative effects of AAS in bodybuilders include an increase in coronary risk factors, cardiomyopathy, acute myocardial infarction, and severe mood and psychotic disorders [4, 5]. Management of steroid-induced cholestatic liver damage requires

prompt withdrawal of the anabolic steroid. Therapeutic strategies in severe cases of cholestasis include application of ursodeoxycholic acid, although there are no controlled trials to validate its use for this purpose [6].

Even in popular sports, a widespred abuse of doping substances exits. The fitness boom has also produced an increasing number of steroid users, who have only a sophisticated knowledge of steroid pharmacology. After opening the borders to the East European black-market, the risk of drug abuse in the young generation has dramatically increased.

References

[1] Dickerman RD, Pertusi RM, Zachariah NY, Dufour, DR, McConathy WJ (1999) Anabolic steroid-induced hepatotoxicity : is it overstated ? *Clin J Sports Med* **9:** 34-39

[2] Braseth NR, Allison Jr. EJ, Gough JE (2001) Exertional rhabdomyolysis in a body builder abusing anabolic androgenic steroids *Eur J Emerg Med* **8:** 155-157

[3] Hartung R, Gerth J, Fünfstück R, Gröne HJ, Stein G (2001) End-stage renal disease in a bodybuilder : a multifactorial process or simply doping ? *Nephrol Dial Transplant* **16:** 163-165

[4] Alvarado RG, Liu JY, Zwolak RM (2001) Danazol and limb-threatening arterial thrombosis : two case reports. *J Vasc Surg* **34:** 1123-1126

[5] Vogt AM, Geyer H, Jahn L, Schänzer W, Kübler W (2002) Cardiomyopathy associated with the uncontrolled self-medication of anabolic steroids. *Z Kardiol* **16:** 163-165

[6] Chitturi, S, Farrell, GC. Drug-induced cholestasis (2001) *Semin Gastrointest Dis* **12:** 113-124